

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

RECEIVED

FEB 26 1996

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)

Rulemaking to Amend Parts 1, 2, 21 and 25)
of the Commissions Rules to Redesignate)
the 27.5-29.5 GHz Frequency Band, to)
Reallocate the 29.5-30.0 GHz Frequency)
Band, to Establish Rules and Policies for)
Local Multipoint Distribution Service and for)
Fixed Satellite Services)

CC Docket No. 92-297

DOCKET FILE COPY ORIGINAL

and)

Suite 12 Group Petition for Pioneer's)
Preference)

PP-22

PETITION FOR SUPPLEMENTAL COMMENTS

OF

QUALCOMM, INCORPORATED

Veronica M. Ahern

Nixon Hargrave Devans & Doyle LLP
One Thomas Circle
Washington, D.C. 20005
202-457-5321

Its Attorney

February 26, 1996

WASH01:38252

No. of Copies rec'd 012
List ABCDE

Table of Contents

	<u>Page</u>
SUMMARY	i
I. BACKGROUND	2
A. Docket 92-297	2
B. Pre-WRC 95	4
C. WRC-95	6
II. ARGUMENT	8
III. CONCLUSION	11

SUMMARY

In this Petition, QUALCOMM, Incorporated requests that the Commission reopen the record in CC Docket No. 92-297, on a limited basis, to solicit additional comment on sharing, technical viability and spectrum efficiency issues among Non-Geostationary Orbit Satellite Systems in the Fixed Satellite Service ("NGSO/FSS"). QUALCOMM believes that this requested action need not delay the interservice Ka Band segmentation plan or the Mobile Satellite Service (feederlink) proposals made by the Commission. Additional comment is essential because:

(1) WRC-95 required that a study of sharing among NGSO/FSS systems be given high priority. The United States has always complied to the fullest extent with ITU Resolutions to which it has subscribed. A good faith effort to study intraservice NGSO/FSS sharing is required to continue this tradition and maintain U.S. credibility. Success in future ITU Conferences may depend on that effort.

(2) the existing record does not contain sufficient analysis to assure that opportunities for competition will be preserved. The WRC-95 noted a need for competition among NGSO/FSS systems. The record as it now stands contains little or no information on intraservice sharing or the possibilities for competition. Similarly, the record is deficient on information regarding technical viability and spectrum efficiency standards.

(3) spectrum allocation and regulatory actions taken by WRC-95 will be finalized by WRC-97. The United States must be prepared with the most complete information on sharing, technical viability and spectrum efficiency in order to participate meaningfully in the WRC-97 process and assure that its interests prevail.

(4) additional comments may show that it will be feasible for more than one NGSO/FSS system to share the allocated spectrum to offer global service. QUALCOMM looks forward to developing information on frequency reuse, access/modulation techniques, constellation geometries, minimum spectrum efficiency guidelines, and minimum bandwidth requirements that could enhance the possibility of sharing among global NGSO/FSS systems.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)

Rulemaking to Amend Parts 1, 2, 21 and 25)
of the Commissions Rules to Redesignate)
the 27.5-29.5 GHz Frequency Band, to)
Reallocate the 29.5-30.0 GHz Frequency)
Band, to Establish Rules and Policies for)
Local Multipoint Distribution Service and for)
Fixed Satellite Services)

CC Docket No. 92-297

and)

Suite 12 Group Petition for Pioneer's)
Preference)

PP-22

PETITION FOR SUPPLEMENTAL COMMENTS

QUALCOMM, Incorporated ("QUALCOMM"), by its attorneys, hereby urgently requests that the Commission solicit additional comments in the above-captioned proceeding. In particular, QUALCOMM believes that the record in this proceeding does not contain sufficient information on sharing criteria among Non-Geostationary Orbit Satellite Systems ("NGSO") in the Fixed Satellite Service ("FSS"). Similarly, the record lacks adequate information regarding technical viability and spectrum efficiency standards.

It was very shortly after the close of the comment period in Docket No. 92-297 that the United States participated in the World Radiocommunication Conference (Geneva 1995) ("WRC-95"). WRC-95 imposed obligations on International Telecommunications Union ("ITU") member countries with respect to NGSO/FSS systems, particularly regarding the possibility of sharing. Because of the obvious importance of the results of WRC-95 on the establishment of rules for

sharing among NGSO/FSS systems, and given that sharing and additional spectrum assignment issues are still to be resolved at WRC-97, QUALCOMM urges the Commission expeditiously to reopen the record of this proceeding, on a limited basis, to solicit additional comments regarding NGSO/FSS sharing, technical viability standards, and spectrum efficiency issues.

This action need not delay the interservice Ka Band segmentation plan or the Mobile Satellite Service (feeder link) proposals made by the Commission. QUALCOMM understands that a consensus plan for sharing the Ka Band on an interservice basis is close to being achieved. This filing, which is concerned primarily with NGSO/FSS intraservice sharing issues, should not impact that process. Moreover, QUALCOMM is sensitive to the Commission's desire to eliminate unnecessary delays in formal FCC proceedings. However, the need to move expeditiously should not compromise the need to develop a complete record so that decisions on service rules and licensing policies for NGSO/FSS are sound.

I. **BACKGROUND**

A. **Docket 92-297**

On July 28, 1995 the Commission released its Third Notice of Proposed Rulemaking and Supplemental Tentative Decision in this proceeding.¹ The Third NPRM proposed a band segmentation plan that would permit both Local Multipoint Distribution Service ("LMDS") and Fixed Satellite Service systems to operate in the 28 GHz frequency band. The proposal also accommodated feeder links for certain

¹ Rulemaking to Amend Parts 2, 21 and 25 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band, to Reallocate the 29.5 - 30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellites, Third Notice of Proposed Rulemaking, CC Docket No. 92-297, FCC 95-287, July 28, 1995 (Third NPRM).

Mobile Satellite Service ("MSS") systems. Further, the Third NPRM requested comment on service rules that would "promote the efficient use of scarce spectrum".²

Of particular note was the proposal in the Third NPRM to segment 500 MHz on a primary basis for NGSO/FSS systems (28.6 GHz to 29.1 GHz earth-to-space) and to propose an additional 500 MHz in the 18.8-19.3 (space to earth) range. This proposal was prompted by the March 1994 application of Teledesic Corporation which requested assignment of 28.6-29.0 GHz (earth to space) and 18.8-19.2 GHz (space to earth).³

Of further particular note was the Commission's request in paragraph 127 of the Third NPRM:

We also request comment on what sort of rules should be created for the NGSO/FSS systems. For example, what sort of financial qualifications should we adopt for these systems? Should spectrum efficiency or service availability standards be adopted? We request specific comment on any technical standards that should be adopted for NGSO/FSS systems that will facilitate sharing under our band segmentation plan.⁴

Thus the Commission singled out the need for technical comment on sharing criteria for NGSO/FSS systems.

The Commission also revealed that it had conducted a technical analysis of NGSO/FSS systems:

² Id. at ¶ 2.

³ Teledesic plans to construct, launch and operate a constellation of 840 satellites operating in Low Earth Orbit ("LEO") to provide domestic and international fixed satellite service. See Application of Teledesic Corporation for a Low Earth Orbit Satellite System in the Fixed Satellite Service, March 21, 1994.

⁴ Third NPRM at ¶ 127 (emphasis added). Some commenters may have originally construed this request to mean sharing between NGSO/FSS systems and other services, such as LMDS or GSO/FSS. However, the results of the WRC-95 make it imperative that sharing among NGSO/FSS systems be studied on a priority basis. See Section II.A. infra.

Our preliminary technical analysis indicates that 500 MHz is the minimum amount of spectrum required to implement a viable system offering NGSO/FSS services.⁵

Other than this reference, however, the Commission did not discuss its technical analysis.

Comments and Reply Comments were filed on September 7 and October 10, 1995. Within the entire record, QUALCOMM has been unable to find any substantive comment on technical standards for sharing among NGSO/FSS systems or comment on the Commission's analysis indicating that 500 MHz is the minimum necessary for a viable NGSO/FSS system. We attribute this to the fact that commenters did not expect that NGSO/FSS technical criteria and assigned spectrum block would soon become a matter of some urgency. Nor did the Commission include much information on NGSO/FSS intraservice sharing issues in the Third NPRM. Most of the Commenters focused their attention on other seemingly more pressing issues, that is, issues that were on the agenda for WRC-95.

B. Pre-WRC 95

In preparation for its participation in WRC-95 the Commission established procedures for public comment, and the operation of an Industry Advisory Committee (IAC). In almost two years of preparation, the Commission rarely focused on issues of sharing among NGSO/FSS systems. Indeed, the whole question of whether NGSO/FSS systems were intended to be included in the WRC-95 deliberations is confusing at best. There can be no doubt that the main focus of the WRC-95 agenda was on MSS⁶. Indeed, the agenda of WRC-95 did not include any specific reference to NGSO/FSS systems. Even the IAC, in its Final Report,

⁵ Third NPRM at ¶ 145

⁶ See Preparation for International Telecommunications Union World Radiocommunication Conferences, IB Docket No. 94-31, 78 RR2d 747, 748 (1995). (Preparatory Report).

recommended certain actions regarding NGSO/FSS only as part of the WRC-97 agenda.⁷

However, the FCC's preparatory work certainly included consideration of NGSO networks,⁸ and, in particular, the regulatory constraints to the development of NGSO operations imposed by Radio Regulation 2613 which required that NGSO networks (both MSS and FSS) protect existing and future GSO networks in the same band. This effectively put NGSO networks in a secondary status, notwithstanding the international allocation table.

Nevertheless, it is unclear whether the FCC intended consideration of NGSO/FSS networks to go much further than consideration of the applicability of RR 2613.⁹ In its discussion of "Future Conference Agendas", the Commission stated:

[We] recommend that the primary focus of WRC-97 be the continued consideration of global satellite service issues. These include removing technical constraints where appropriate, easing unnecessary regulatory burdens, and obtaining additional spectrum to allow global satellite systems to go forward -- including those of new proposals such as Teledesic's proposal for a NGSO/FSS network.¹⁰

To this the FCC added the following footnote:

We will propose that WRC-97 consider allocations and regulatory aspects for non-GSO FSS systems in the Ka band.¹¹

⁷ Industry Advisory Committee for the ITU 1995 World Radiocommunications Conference, Final Report, May 4, 1995.

⁸ See Preparatory Report, paras 63-68.

⁹ See, e.g., Preparatory Report, fn. 127.

¹⁰ Preparatory Report, p. 763-4 (emphasis added).

¹¹ Id., fn. 165 (emphasis added).

We take this to mean that, as of its last official report in preparation for the WRC-95, the Commission did not anticipate that NGSO/FSS spectrum assignment and regulatory issues would be considered at WRC-95. NGSO/FSS issues were addressed by the "New Regulatory Issues" Subcommittee of the U.S. WRC-95 Delegation, in its preparatory work. However, this Subcommittee did not start its work until after August 1995, shortly before comments were due in CC Docket No. 92-297.

C. WRC-95

WRC-95 began on October 23, 1995, after the last round of comments in Docket No. 92-297. It quickly became apparent that use of NGSO/FSS systems would become a significant focus of the Conference. Indeed, the issues of allocation of spectrum and regulatory classification were introduced into the Conference agenda. However, one very important Conference Resolution makes it clear that additional work on sharing issues is intended to be completed prior to WRC-97, so that spectrum and regulatory issues can be dealt with in final form at that Conference.

Plenary Resolution-1 (Res PLEN-1) specifically addressed use of the Ka Band by NGSO/FSS systems. Res PLEN-1 considered that, irrespective of the urgency attached to the development of NGSO/FSS systems:

technical, sharing and regulatory issues should be studied in order to achieve the most efficient use of the spectrum that may be available for these systems.¹²

Res PLEN-1 also considered that:

¹² Res PLEN-1, Final Acts of the World Radiocommunication Conference, Geneva, 1995, p. 267.

there is a need for the provision of services on a competitive basis between GSO/FSS and non-GSO/FSS as well as between non-GSO/FSS and non-GSO/FSS.¹³

In light of these considerations, the Plenary resolved

to request the ITU-R to study, as a matter of urgency, the criteria to be applied for the sharing situations listed [...] above with a view to facilitating sharing . . .

It is very clear that sharing criteria for NGSO/FSS systems took on an importance in WRC-95 that it did not have in the comments in this Docket 92-297 proceeding. It is therefore prudent for the Commission to request additional comment on those issues.¹⁴

¹³ Id. (emphasis added). It is, of course, possible that a second NGSO/FSS system (with which spectrum would be required to be shared) would be a non-U.S. system. This fact does not diminish the responsibility of the United States, in light of Res PLEN-I, to develop a full record on sharing issues before proceeding with a final decision on service rules and spectrum assignment.

¹⁴ QUALCOMM does not believe that there is any requirement that the Commission reopen comment on other aspects of this Docket. In particular, we see no reason to delay adoption of the band segmentation plan involving Fixed Service, FSS and MSS services, or further action on NGSO/MSS feeder links. We would urge, however, that the Commission take no action that would preclude the possibility of sharing between NGSO/FSS systems.

II. **ARGUMENT**

The Commission Should Reopen the Comment Period in Docket 92-297 to Allow Supplemental Comments on the Sharing Criteria for NGSO/FSS Systems

A. **The Results of WRC-95 require that sharing issues be given a high priority**

The spirit of the ITU requires that each member country do more than pay lip service to the Plenary Resolutions of World Radiocommunications Conferences. The U.S. has always complied to the fullest extent with the ITU Resolutions to which it has subscribed. The Conference was clearly concerned about sharing criteria for NGSO systems because of a concern that, without such criteria, competition among and between NGSO and GSO systems could not develop. It is therefore incumbent on the United States, before it takes any steps that could limit opportunities for competition, to seriously study whether sharing will be possible, how it can be achieved and what constraints must be placed upon systems to ensure a sharing environment. It is also important to note that a successful outcome in future ITU conferences, and particularly in WRC-97, may depend upon whether the U.S. makes a good faith effort to comply with Res PLEN-I. We urge that U.S. analysis of sharing take place expeditiously so as not to delay action on service rules and licensing policies.

B. **The existing record does not provide sufficient analysis to assure that opportunities for competition will be preserved.**

The record in Docket Nos. 92-297 contains few references to NGSO/FSS sharing and little analysis. The most disturbing comment, in a footnote by Teledesic, is not optimistic on the possibility of sharing, and consequently of competition:

Co-frequency sharing among non-GSO satellite systems may be possible but cannot be evaluated meaningfully until another such system is proposed. These sharing issues

are complex, involving considerations of system geometry and signal design. Sharing becomes a statistical function based on the frequency and duration of interference. Generally, however, for non-GSO systems with broad coverage to accommodate advanced applications with a high degree of service quality and reliability, co-frequency sharing among systems is probably not possible and band segmentation is required.¹⁵

If band segmentation of the assigned NGSO/FSS spectrum is the only sharing technique available, then the Commission's preliminary technical analysis concluding that 500 MHz is the minimum bandwidth required takes on great significance. At the very least, the Commission should make clear its basis for that conclusion and invite comment on it.¹⁶ Since Teledesic's application requires assignment of the entire band made available for NGSO/FSS on a primary basis by the Commission, and if the Commission's preliminary analysis goes unchallenged, it seems very unlikely that there will be sharing of any kind if Teledesic is authorized. One other Commenter, TRW, Inc. alluded to that problem in its Reply Comments in

¹⁵ Comments of Teledesic Corporation, September 7, 1995, n. 8. (Emphasis added). Unfortunately, QUALCOMM must agree with Teledesic's conclusion as long as it is understood to apply to Time Division Multiple Access systems. QUALCOMM believes other multiple access schemes (for example, CDMA or Code Division Multiple Access) and constellation geometries may improve the co-frequency sharing situation. Full or partial co-frequency sharing must be considered along with an analysis of spectrum efficiency standards to facilitate operation of more than one system in this band. The Commission was successful in adopting a frequency plan that accommodated a total of five (5) systems in the NGSO/MSS proceeding. Further, it should be noted that in connection with ITU preparatory activities, Teledesic has resisted doing a sharing study, even with another system that would mirror the technical and operational characteristics of its system. Since WRC-95, and because of Res. PLEN 1, there is now ample reason to require that sharing studies be prepared.

¹⁶ QUALCOMM looks forward to an opportunity to comment on the possibility of reducing the minimum bandwidth required through use of multiple beams, more efficient access/modulation techniques, frequency reuse and other techniques.

asking the Commission not to act precipitously in assigning spectrum for the NGSO/FSS.¹⁷

A few commenters have addressed sharing between NGSO/MSS and NGSO/FSS, as well as between GSO and NGSO systems, but no one has focused on the fact that if sharing among NGSO/FSS systems is not possible, and the Teledesic application is granted, then there can be no competition in this field and a major objective of both the ITU and the FCC will be foregone. Grant of a license to a system incapable of sharing will render the requirements of Res. PLEN-1 moot and could create additional difficulties for the United States at WRC-97. Moreover, it is clear that in today's environment of increased spectrum demand, responsible sharing is essential. It is not appropriate to dedicate a large segment of bandwidth to an unproven system that is incapable of sharing.

Under these circumstances, it is clear that the present record is inadequate and further opportunity should be given to comment on sharing possibilities among potential NGSO/FSS systems. It seems logical first to seek explicit comment on the number of NGSO/FSS global systems that can operate in the paired 500 MHz band, based on certain technical characteristics that facilitate sharing.

In addition, QUALCOMM suggests that among the issues that can be addressed by commenters are these:

What is the minimum spectrum efficiency and service availability standard that can accommodate at least two NGSO/FSS systems? For example, if satellite capacity is limited by the amount of power in the spacecraft, can a constellation be designed to operate in a smaller amount of spectrum, utilizing power more efficiently to achieve higher system capacity?

¹⁷ Reply Comments of TRW, Inc. October 10, 1995, p. 36.

Which parts of the assigned spectrum can most efficiently be used by NGSO/FSS service links and which parts by gateways (shared or exclusive)?

What is the technical and operational feasibility of NGSO/FSS gateway terminal operating in a secondary mode, in spectrum assigned on a primary basis to NGSO/FSS and what are realistic sharing conditions?

What are the possible technical, operational and political consequences if a NGSO/FSS system licensed by the United States is unable to share with a system licensed by another country, given the clear intention of Res PLEN-1 to support competition?

Finally, QUALCOMM requests that the Commission reopen the record in Docket No. 92-297, rather than include sharing analysis in any other proceeding. Questions relating to sharing should be addressed in the proceeding where service rules and licensing policies are being developed. Furthermore, sharing issues were originally raised by the Commission in this docket and whatever scant information is available can be found in the record of this proceeding.


III. CONCLUSION

QUALCOMM believes that the existing record in Docket 92-297 does not provide sufficient analysis of NGSO/FSS sharing criteria to satisfy the good faith requirements of a member of the ITU. QUALCOMM urges the Commission expeditiously to reopen the comment period in this docket for the narrow purpose of

soliciting additional views on the questions posed in paragraph 127 of the Third NPRM and on the conclusions of its preliminary technical analysis found in paragraph 145.

Respectfully submitted,

QUALCOMM Incorporated



By: Veronica M. Ahern
Nixon Hargrave Devans & Doyle LLP
One Thomas Circle
Washington, D.C. 20005
202-457-5321

Its Attorney

February 26, 1996

SERVICE LIST

Chairman Reed E. Hundt*
Federal Communications Commission
1919 M Street, N.W.
Room 814
Washington, DC 20554

Commissioner James H. Quello*
Federal Communications Commission
1919 M Street, N.W.
Room 802
Washington, DC 20554

Commissioner Andrew C. Barrett*
Federal Communications Commission
1919 M Street, N.W.
Room 826
Washington, DC 20554

Commissioner Susan Ness*
Federal Communications Commission
1919 M Street, N.W.
Room 832
Washington, DC 20554

Commissioner Rachelle B. Chong*
Federal Communications Commission
1919 M Street, N.W.
Room 844
Washington, DC 20554

Scott Blake Harris
Chief, International Bureau
Federal Communications Commission
2000 M Street, N.W.
Room 800, Stop Code 0800
Washington, DC 20554

Thomas Tycz
Division Chief
Satellite and Radiocommunication Division
International Bureau
Federal Communications Commission
2000 M Street, N.W.
Washington, DC 20554

Cecily Holiday
Deputy Division Chief
Satellite and Radio Communications
Division
International Bureau
Federal Communications Commissions
2000 M Street, N.W.
Washington, DC 20554

Donald H. Gips
Deputy Chief
Office of Plans and Policy
Federal Communications Commission
1919 M Street, N.W.
Room 822
Washington, DC 20554

Gregory Rosston
Office of Plans and Policy
Federal Communications Commission
1919 M Street, N.W.
Room 822
Washington, DC 20554

Ruth Milkman
Senior Legal Advisor
Chairman Reed E. Hundt
1919 M Street, N.W.
Room 814
Washington, DC 20554

Rudolfo M. Baca
Legal Advisor
Commissioner James H. Quello
1919 M Street, N.W.
Room 802
Washington, DC 20554

Brian Carter
Special Advisor
Commissioner Andrew C. Barrett
2025 M Street, N.W.
Room 7218
Washington, DC 20554

Lisa B. Smith
Legal Advisor
Commissioner Andrew C. Barrett
1919 M Street, N.W.
Room 826
Washington, DC 20554

Jill Lockett
Special Advisor
Commissioner Rachelle B. Chong
1919 M Street, N.W.
Room 844
Washington, DC 20554

David A. Siddall
Legal Advisor
Commissioner Susan Ness
1919 M Street, N.W.
Room 832
Washington, DC 20554

Gerald Musarra
Space & Strategic Missiles Sector
Lockheed Martin Corporation
1725 Jefferson Davis Highway
Arlington, VA 22202

Leonard Robert Raish
Fletcher Heald & Hildreth, PLC
1300 North 17th Street
11th Floor
Rosslyn, VA 22209-3801
Counsel for the Fixed Point-to-Point
Communications Section, Network
Equipment Division of the
Telecommunications Industry Assoc.,
Digital Microwave Corporation, and
Harris Corporation-Farion Div.

Paul E. Misener
Wiley Rein & Fielding
1776 K Street, N.W.
Washington, DC 20006
Counsel for Texas Instruments, Inc.

Peter M. Connolly
Koteen & Naftalin
1150 Connecticut Avenue, N.W.
Washington, DC 20036
Counsel for Telephone and Data
Systems, Inc.

Joseph A. Godles
W. Kenneth Ferree
Goldberg Godles Wiener & Wright
1229 19th Street, N.W.
Washington, DC 20036
Counsel for PanAmSat Corporation

John F. Beasley
William B. Barfield
Jim O. Llewellyn
BellSouth Corporation
1155 Peachtree Street, NE
Suite 1800
Atlanta, GA 30309-3610

Charles P. Featherstun
David G. Richards
1133 21st Street, N.W.
Suite 900
Washington, DC 20036
Counsel for BellSouth Corporation,
BellSouth Telecommunications, Inc.,
and BellSouth Enterprises, Inc.

William A. Graven
Entertainment Made Convenient
("Emc³") U.S.A., Inc.
8180 Greensboro Drive
Suite 1000
McLean, VA 22102

Kristin A. Ohlson
Pacific Telesis Wireless
Broadband Services
2410 Camino Ramon
Suite 100
San Ramon, CA 94583

James L. Wurtz
Margaret E. Garber
Pacific Telesis Group - Washington
1275 Pennsylvania Avenue, N.W.
Washington, DC 20004

Jon M. Schill
RioVision, Inc.
P.O. Box 1065
1800 East Highway 83
Weslaco, TX 78596

John G. Lamb, Jr.
Northern Telecom Inc.
2100 Lakeside Boulevard
Richardson, TX 75081-1599

Stephen L. Goodman
Halprin Temple Goodman & Sugrue
1100 New York Avenue, N.W.
Suite 650, East Tower
Washington, DC 20005
Counsel for Northern Telecom Inc.

Leonard J. Kennedy
Laura H. Phillips
Christina H. Burrow
Dow Lohnes & Albertson
1255 23rd Street, N.W.
Suite 500
Washington, DC 20037
Counsel for Cox Enterprises, Inc.,
Comcast Corporation, and Jones
Intercable, Inc.

Douglas A. Gray
Program Manager
Microwave Communication Group
Hewlett-Packard Company
1501 Page Mill Road, 4A-F
Palo Alto, CA 94304

Frank Michael Panek
2000 West Ameritech Center Drive
Room 4H84
Hoffman Estates, IL 60196
Counsel for Ameritech

Cheryl A. Tritt
Diane S. Killory
Eric N. Richardson
Morrison & Foerster
2000 Pennsylvania Avenue, N.W.
Suite 5500
Washington, DC 20006
Counsel for Satellite Industry
Association

Richard S. Wilensky
Middleberg Riddle & Gianna
2323 Bryan Street
Suite 1600
Dallas, TX 75201
Counsel for ComTech Associates, Inc.

Harold K. McCombs, Jr.
Janice L. Lower
Barry F. McCarthy
Michael R. Postar
Tanja M. Shonkwiler
Duncan Weinberg Miller & Pembroke, PC
1615 M Street, N.W.
Suite 800
Washington, DC 20036

J. Michael Rhoads
President
M3 Illinois Telecommunications Corp.
P.O. Box 292557
Kettering, OH 45429

Marilyn Mohrman-Gillis
Lonna M. Thompson
Association of America's Public
Television Stations
1350 Connecticut Avenue, N.W.
Suite 200
Washington, DC 20036

Paula A. Jameson
Gregory Ferenbach
Public Broadcasting Service
1320 Braddock Place
Alexandria, VA 22314

Jeffrey A. Krauss, Ph.D.
Telecommunications and
Technology Policy
17 West Jefferson Street
Suite 106
Rockville, MD 20850

Paul J. Sinderbrand
Sinderbrand & Alexander
888 16th Street, N.W.
5th Floor
Washington, DC 20006-4103
Counsel for Wireless Cable Association
International, Inc.

Donald C. Rowe
New England Telephone and Telegraph
Company and New York Telephone
1111 Westchester Avenue
White Plains, NY 10604
Counsel for NYNEX

Gene A. Robinson
Senior Fellow
Texas Instruments Inc.
P.O. Box 650311, MS 3933
Dallas, TX 75265

John G. Raposa
HQE03J27
GTE Service Corporation
P.O. Box 152092
Irving, TX 75015-2092

Gail L Polivy
GTE Service Corporation
1850 M Street, N.W.
Suite 1200
Washington, DC 20036

Daniel L. Brenner
Loretta P. Polk
1724 Massachusetts Avenue, N.W.
Washington, DC 20036
Counsel for the National Cable
Television Association, Inc.

Charles F. Newby
Vice President
Titan Information Systems
3033 Science Park Road
San Diego, CA 92121

John P. Janka
Steven H. Schulman
Latham & Watkins
1001 Pennsylvania Avenue, N.W.
Suite 1300
Washington, DC 20004
Counsel for Hughes Communications
Galaxy, Inc.

Tom Davidson
Jennifer Manner
Akin Gump Strauss Hauer & Feld LLP
1333 New Hampshire Avenue
Washington, DC
Counsel for Teledesic Corporation

Lon C. Levin
American Mobile Satellite Corp.
10802 Parkridge Boulevard
Reston, VA 22091

Philip Malet
Pantelis Michalopoulos
Colleen Sechrest
Steptoe & Johnson
1330 Connecticut Avenue, N.W.
Washington, DC 20036
Counsel for Motorola, Inc. and Iridium,
Inc.

Norman P. Leventhal
Raul R. Rodriguez
Stephen D. Bauch
Bernard A. Solnik
Leventhal Senter & Lerman
2000 K Street, NW
Suite 600
Washington, DC 20006-1809
Counsel for TRW Inc.

Charles T. Force
Associate Administrator for Space
Communications
NASA
Headquarters
Washington, DC 20546

Philip V. Otero
Alexandria P. Humphrey
GE American Communications, Inc.
1750 Old Meadow Road
McLean, VA 22102

Judith R. Maynes
Elaine R. McHale
AT&T Corporation
295 North Maple Avenue
Basking Ridge, NJ 07920

Peter A. Rohrbach
Karis A. Hastings
Hogan & Hartson, LLP
555 Thirteenth Street, NW
Washington, DC 20004
Counsel for GE American
Communications, Inc.

Thomas J. Keller
Julian L. Shepard
Verner Liipfert Bernhard
McPherson and Hand, Chartered
901 15th Street, N.W.
Suite 700
Washington, DC 20005
Counsel for Orion Network Systems,
Inc.

Andrew D. Lipman
Margaret M. Charles
Swidler & Berlin, Chartered
3000 K Street, N.W.
Suite 300
Washington, DC 20007
Counsel for Andrew Corporation

Perry W. Haddon
Vice President
GHz Equipment Company, Inc.
1834 E. Baseline Road
Suite 202
Tempe, AZ 85283-1508

Michael R. Gardner
The Law Offices of Michael R. Gardner,
P.C.
1150 Connecticut Avenue, N.W.
Suite 710
Washington, DC 20036
Counsel for CellularVision

Philip L. Verveer
Michele R. Pistone
Willkie Farr & Gallagher
1155 21st Street, N.W.
Suite 600
Washington, DC 20036-3384
Counsel for Loral Aerospace Holdings,
Inc.

Douglas Dwyre
President
Loral/QUALCOMM Partnership, LP
Globalstar
3200 Zanker Road
P.O. Box 640670
San Jose, CA 95164-0670

Leslie A. Taylor
Leslie Taylor Associates
6800 Carlynn Court
Bethesda, MD 20817-9341
Counsel for Loral/QUALCOMM
Partnership, LP

Kathleen Q. Abernathy
David A. Gross
1818 N Street, N.W.
Suite 800
Washington, DC 20036
Counsel for AirTouch Communications,
Inc.

Michael D. Kennedy
Barry Lambergman
Motorola, Inc.
1350 I Street, N.W.
Washington, DC 20005

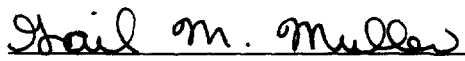
James G. Ennis
Patricia A. Mahoney
F. Thomas Tuttle, Deputy General Counsel
Iridium, Inc.
1401 H Street, N.W.
Washington, DC 20005

Warren Richards
U.S. Department of State
2201 C Street, N.W.
4th Floor/CIP
Washington, DC 20520

Richard Parlow
NTIA
Department of Commerce
14th Street and Constitution Avenue, N.W.
Washington, DC 20230

William Hatch
NTIA
Department of Commerce
14th Street and Constitution Avenue, N.W.
Washington, DC 20230

International Transcription Service
1919 M Street, N.W.
Room 246
Washington, DC 20554


Gail M. Mullen

*Via Hand Delivery